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RANUNCULUS FICARIA (RANUNCULACEAE) NATURALIZED IN TEXAS: UPDATE

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ABSTRACT

In the 7 years since a report of its naturalization along a creek in Tarrant County, Texas, *Ranunculus ficaria* (now treated within the genus *Ficaria* as *F. verna*) has increased in number of plants and coverage at that locality. The Texas plants produce axillary bulbils and flowers apparently are sterile, producing only unexpanded achenes. Photos show population structure and characteristics of the habitat.

Ranunculus ficaria L. was earlier observed (Nesom 2008) to be naturalized along Overton Creek within Overton Park in Fort Worth, Texas. It was noted that "Thirty discrete plants, clearly naturalized, grow in an area of about 30 square feet ... . A second population of five scattered plants occurs on the stream terrace about 300 yards downstream." In 2015, areal coverage of plants of *Ranunculus ficaria* has increased by about 6 times; the original larger population has expanded, additional colonies have formed downstream between 20 and 50 yards from the original, and an additional large population has arisen downstream of plants seen in 2008, increasing the linear extent of the total population to about 400 yards. Photos of subgroups of the Overton Park population (Figs. 1–7) show the characteristic habitat and dispersion of the plants — all are growing in wet soil immediately beside the water or close by on the low, frequently flooded terrace.

Phylogenetic studies indicate that *Ranunculus ficaria* is best treated within the Eurasian/northern African genus *Ficaria* Guett. (comprising ca. 5 species) rather than within *Ranunculus* (Paun et al. 2005; Emadzade et al. 2010), this alternate taxaonomy already adopted by Weakley (2012). The genera *Myosurus* L. and *Ceratocephala* Moench as a pair are sister to strictly defined *Ranunuculus*. *Ficaria* and its sister genus *Coptidium* (Prantl) Beurl. ex Rydb. are sister to the *Ranunculus/Myosurus* clade. *Ranunuculus ficaria* L. is *Ficaria verna* Hudson; typical *Ficaria verna* is equivalent to *Ranunculus ficaria* subsp. *bulbifera*.

Figure 1. *Ficaria verna* along Overton Creek in Fort Worth, Texas. 20 March 2015.

Figures 2 and 3. *Ficaria verna* along Overton Creek in Fort Worth, Texas. 20 March 2015.

Figures 4 and 5. *Ficaria verna* along Overton Creek in Fort Worth, Texas. 20 March 2015.

Figures 6 and 7. *Ficaria verna* along Overton Creek in Fort Worth, Texas. 20 March 2015.

Ficaria verna in the USA sometimes forms dense monocultures (see numerous internet photos) and has been found to limit germination of other species by allelopathy (Cippolini & Schradin 2011; Cipollini & Flint 2013). The species is becoming invasive in the eastern and northeastern USA and adjacent Canada (Krings et al. 2005; Post et al. 2009; Axtell et al. 2010) and also is naturalized in the Southeast (Alabama – Davenport 2011; South Carolina – Marlow et al. 2014, Marlow 2015) and in north-central Texas.

Sell (1994) distinguished five subspecies within *Ficaria verna* (as *Ranunculus ficaria*) based primarily on leaf and flower size, achene fertility, and whether or not axillary bulbils are produced after flowering. His key has been reproduced frequently in reference to North American populations (e.g., Krings et al. 2005; Post et al. 2009; Axtell et al. 2010; Weakley 2012). Post et al. conducted a morphometric study of North American plants, finding evidence to support recognition of the 5 infrataxa recognized in Europe and evidence that all of them are naturalizing in the USA.

Figure 8. Broadly cylindric-ellipsoid axillary bulbils of *Ficaria verna*, Overton Creek population, 27 April 2015. Bulbils are 4–9 mm long.

The Overton Creek plants were characterized in 2008 this way: "The leaves are numerous and densely crowded at the base on short stems. Most [leaf blades] are ca. 6–7 cm long and 5–5.5 cm wide, ranging smaller to 3 x 3 cm, on petioles 8–10 cm long. The flowers are ca. 2.5–4 cm in diameter with 7–9 petals 15–19 mm long, 6–8 mm wide. Pollen (2 plants) is ca 70% viable, as

judged by uniform size and full-staining in lactophenol-cotton blue; the remaining 30% of the grains are non-staining and distinctly smaller (and highly variable in size). All achenes apparently are glabrous and infertile. Axillary bulbils were not present at the time of collection (8 March) but were in abundant production by 2 April — they are whitish, conic-cylindric to short-cylindric, and essentially without surface features." These measurements are consistent with plants observed in 2015. Broadly cylindric-ellipsoid axillary bulbils, 4–9 mm long, are shown in Figure 8 from plants photographed 27 April 2015 — these are representative of the whole Overton Creek population. On 27 April, all peduncles had almost completely withered, although the leaves were still green.

The Overton Creek plants were orginally identified (Nesom 2008) as *Ranunculus ficaria* subsp. *bulbifera*, as they produce axillary bulbils and unexpanded, infertile achenes and the vegetative dimensions best matched those of subsp. *bulbifera* in published keys. According to Sell, subsp. *bulbifera* is the only entity with infertile ("poorly developed") achenes. Subsp. *bulbifera* and subsp. *ficariiformis* are the only two that produce axillary bulbils (both entities also are polyploid; the others are diploid). Post et al. (2009) and Axtell et al. (2010), without comment, identified the Texas plants as subsp. *ficariiformis*, perhaps weighting the diagnostic value of bulbil shape, noted by Sell to be "globular, rounded-obtuse" in subsp. *bulbifera*, "ovoid or globular" in subsp. *ficariiformis*. Bulbil shape, however, is not included as as diagnostic feature in the key to subspecies by Sell or those who have adopted and republished his key.

Ficaria verna has recently been documented in Greenville and York counties, South Carolina (Marlow et al. 2014 and Marlow 2015, including many color photos). Plants from Lake Conestee Nature Park in Greenville County are identified by Marlow et al. and Marlow (2015), citing the key from Weakley (2012), as *Ficaria verna* subsp. *verna* (= subsp. *bulbifera*) — implying that achenes are infertile (this is not specified in their published observations but photos in Marlow 2015 show expanded, apparently fertile achenes: jkm130415_346, jkm130415_350); bulbils are globose to subglobose: e.g., jkm130612_230). A different population from Greenville Co. (along an urban creek) and another from York Co. (along an urban creek in Rock Hill) are identified in Marlow (2015) as *Ficaria verna* subsp. *ficariiformis*; these plants produce a range of bulbil shapes, from globose or subglobose to broadly cylindric-ellipsoid to distinctly club-shaped: e.g., jkm140124_584.

The Alabama voucher (Davenport 2011; see image at Alabama Plant Atlas Editorial Committee 2015) cannot be identified to infraspecific level — it is a young plant perhaps collected prior to bulbil formation, without fruits, and only 2 leaves are represented.

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